

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY  
540 S. MORRIS AVE., MONTGOMERY, AL 36115  
ALPBET ANALYSES**

**REPORT OF SAMPLE DELIVERY GROUP #1100246**

Project: Dimock Residential GW Site, Dimock, PA  
Analysis method: Gross Alpha and Beta on Water Samples  
Report ID: 1100246-ALPBET  
Report type: Original  
Date reported: 03/05/2012  
Total pages in report: 33

**SAMPLES**

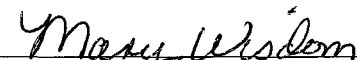
NAREL Sample #	Client Sample ID	Location	Matrix	Date Collected	Date Received
B2.01498T	EB02	PA:DIMOCK	WATER-DRINKING	02/05/2012	02/07/2012
B2.01499U	HW45	PA:DIMOCK	WATER-DRINKING	02/06/2012	02/07/2012
B2.01510V	FB11	PA:DIMOCK	WATER-DRINKING	02/06/2012	02/08/2012
B2.01511W	HW30	PA:DIMOCK	WATER-DRINKING	02/06/2012	02/08/2012
B2.01513Y	HW31	PA:DIMOCK	WATER-DRINKING	02/06/2012	02/08/2012
B2.01514Z	HW43	PA:DIMOCK	WATER-DRINKING	02/06/2012	02/08/2012
B2.01515A	HW15A	PA:DIMOCK	WATER-DRINKING	02/07/2012	02/08/2012
B2.01518D	HW31Z	PA:DIMOCK	WATER-DRINKING	02/06/2012	02/08/2012
B2.01571J	HW47	PA:DIMOCK	WATER-DRINKING	02/08/2012	02/09/2012
B2.01572K	FB12	PA:DIMOCK	WATER-DRINKING	02/07/2012	02/09/2012
B2.01573L	FB13	PA:DIMOCK	WATER-DRINKING	02/08/2012	02/09/2012
B2.01574M	HW38	PA:DIMOCK	WATER-DRINKING	02/08/2012	02/09/2012
B2.01575N	HW51	PA:DIMOCK	WATER-DRINKING	02/07/2012	02/09/2012
B2.01623D	HW21	PA:DIMOCK	WATER-DRINKING	02/09/2012	02/10/2012
B2.01624E	HW23	PA:DIMOCK	WATER-DRINKING	02/08/2012	02/10/2012
B2.01625F	HW48	PA:DIMOCK	WATER-DRINKING	02/08/2012	02/10/2012
B2.01626G	HW48Z	PA:DIMOCK	WATER-DRINKING	02/08/2012	02/10/2012
B2.01728M	FB15	PA:DIMOCK	WATER-DRINKING	02/10/2012	02/13/2012
B2.01729N	HW16	PA:DIMOCK	WATER-DRINKING	02/10/2012	02/13/2012
B2.01730F	HW16Z	PA:DIMOCK	WATER-DRINKING	02/10/2012	02/13/2012

**EXCEPTIONS**

1. **Packaging and shipping**—No problems were observed.
2. **Documentation**—NAREL originally agreed to analyze 71 samples for this project, but sample collectors collected and shipped more samples than expected. NAREL then agreed to analyze 100 samples, which would make five batches of 20 for QC purposes. Actually 101 samples were received. With the client's permission, NAREL did not analyze the field blank received in the last shipment thus making the agreed upon total of 100 samples for analysis.
3. **Sample preparation**—No problems were encountered.
4. **Analysis**— No problems were encountered.
5. **Holding times**—No holding times were specified.

## CERTIFICATION

I certify that this data report complies with the terms and conditions of the Quality Assurance Project Plan, except as noted above. Release of the data contained in this report has been authorized by the Director of the Center for Environmental Radioanalytical Laboratory Science and the NAREL Quality Assurance Manager, or their designees, as verified by the following signatures.



Mary F. Wisdom  
Quality Assurance Manager, NAREL

3-8-12

Date



John G. Griggs, Ph.D.  
Director, Center for Environmental Radioanalytical  
Laboratory Science

3/14/12

Date

## GENERAL INFORMATION

### SAMPLE TYPES

BLD	Blind sample
FBK	Field blank
SAM	Normal sample

### ANALYSIS QC TYPES

ANA	Normal analysis
DUP	Laboratory duplicate
LCS	Laboratory control sample (blank spike)
MS	Matrix spike
MSD	Matrix spike duplicate
RBK	Method blank

### QUALITY INDICATORS

RPD	Relative Percent Difference
%R	Percent Recovery
Z	Number of standard deviations by which a QC measurement differs from the expected value

### EVALUATION OF QC ANALYSES

A method blank result is considered unacceptable if it is more than 3 standard deviations below zero or more than 3 standard deviations above a predetermined upper control limit. For some analyses NAREL has set the upper control limit at zero. For others the control limit is a small positive number.

NAREL evaluates the results of duplicate and spike analyses using "Z scores." A Z score is the number of standard deviations by which the QC result differs from its ideal value. The score is considered acceptable if its absolute value is not greater than 3.

The Z score for a spiked sample is computed by dividing the difference between the measured value and the target value by the combined standard uncertainty of the difference.

The Z score for a duplicate analysis is computed by dividing the difference between the two measured values by the combined standard uncertainty of the difference. When the precision of paired MS/MSD analyses is evaluated, the native sample activity is subtracted from each measured value and the net concentrations are then converted to total activities before the Z score is computed.

Each standard uncertainty used to compute a Z score includes an additional fixed term to represent sources of measurement error other than counting error. This additional term is not used in the evaluation of reagent blanks.

NAREL reports the "relative percent difference," or RPD, between duplicate results and the "percent recovery," or %R, for spiked analyses, but does not use these values for evaluation.

## GENERAL INFORMATION (CONTINUED)

### GROSS ALPHA AND BETA ANALYSIS

In comparison to the methods employed to determine radionuclide-specific activities, the method employed by NAREL to determine gross alpha and beta activity in water samples has the potential for greater analytical bias. It should be noted that this potential analytical uncertainty is not included in the two-sigma counting uncertainty term. Therefore, gross alpha and beta results should be used as gross approximations of the alpha and beta activity present.

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**ANALYSIS SUMMARY**

Analysis Procedure: NAREL GR-01  
Title: Gross Alpha and Beta on Water Samples

NAREL Sample #	QC Type	Preparation Procedure	Date Completed	Assay Batch #	QC Batch #
B2.01498T	DUP	N/A	02/22/2012	0015727M	0008475J
B2.01499U		N/A	02/22/2012	0015727M	0008475J
B2.01510V		N/A	02/22/2012	0015727M	0008475J
B2.01511W		N/A	02/22/2012	0015727M	0008475J
B2.01513Y		N/A	02/22/2012	0015727M	0008475J
B2.01514Z		N/A	02/22/2012	0015727M	0008475J
B2.01515A		N/A	02/22/2012	0015727M	0008475J
B2.01518D		N/A	02/22/2012	0015727M	0008475J
B2.01518D		N/A	02/22/2012	0015727M	0008475J
B2.01571J		N/A	02/22/2012	0015727M	0008475J
B2.01572K		N/A	02/22/2012	0015727M	0008475J
B2.01573L		N/A	02/22/2012	0015727M	0008475J
B2.01574M		N/A	02/23/2012	0015727M	0008475J
B2.01575N		N/A	02/23/2012	0015727M	0008475J
B2.01623D		N/A	02/23/2012	0015727M	0008475J
B2.01624E		N/A	02/23/2012	0015727M	0008475J
B2.01625F		N/A	02/22/2012	0015727M	0008475J
B2.01626G		N/A	02/22/2012	0015727M	0008475J
B2.01728M		N/A	02/22/2012	0015727M	0008475J
B2.01728M	MS	N/A	02/22/2012	0015727M	0008475J
B2.01729N		N/A	02/22/2012	0015727M	0008475J
B2.01730F	LCS	N/A	02/22/2012	0015727M	0008475J
LCS-00631467U *		N/A	02/22/2012	0015727M	0008475J
RBK-00631468V *		N/A	02/22/2012	0015727M	0008475J

\* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

**PREPARATION METHOD(S) USED**

Procedure ID	Title

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01498T	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 17:49	100.0	GQ2A	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-6.60e-02	9.3e-01	9.1e-01	PCI/L	02/22/2012 17:49 CST
Beta	1.10e+00	1.1e+00	1.7e+00	PCI/L	02/22/2012 17:49 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01499U	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.000e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 17:49	100.0	GQ2B	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	5.13e-01	3.3e+00	3.0e+00	PCI/L	02/22/2012 17:49 CST
Beta	3.60e+00	3.1e+00	4.6e+00	PCI/L	02/22/2012 17:49 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01510V	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 17:49	100.0	GQ2C	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-7.72e-02	9.5e-01	8.9e-01	PCI/L	02/22/2012 17:49 CST
Beta	2.76e-01	1.1e+00	1.7e+00	PCI/L	02/22/2012 17:49 CST



**U.S. ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01511W	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 17:49	100.0	GQ2D	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	7.94e-01	1.7e+00	1.4e+00	PCI/L	02/22/2012 17:49 CST
Beta	3.14e+00	1.5e+00	2.1e+00	PCI/L	02/22/2012 17:49 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01513Y	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.000e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 19:29	100.0	GQ2A	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-2.45e-01	3.4e+00	3.4e+00	PCI/L	02/22/2012 19:29 CST
Beta	4.86e+00	3.1e+00	4.5e+00	PCI/L	02/22/2012 19:29 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01514Z	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 19:29	100.0	GQ2B	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.30e+00	1.7e+00	1.4e+00	PCI/L	02/22/2012 19:29 CST
Beta	4.42e+00	1.6e+00	2.1e+00	PCI/L	02/22/2012 19:29 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01515A	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 19:29	100.0	GQ2C	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	8.59e-01	1.7e+00	1.5e+00	PCI/L	02/22/2012 19:29 CST
Beta	1.76e+00	1.3e+00	2.0e+00	PCI/L	02/22/2012 19:29 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01518D	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.000e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 19:29	100.0	GQ2D	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-6.35e-01	3.3e+00	3.2e+00	PCI/L	02/22/2012 19:29 CST
Beta	3.99e+00	3.2e+00	4.7e+00	PCI/L	02/22/2012 19:29 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01518D	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.000e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	DUP
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 21:09	100.0	GQ2A	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	4.35e+00	4.3e+00	3.4e+00	PCI/L	02/22/2012 21:09 CST
Beta	2.36e+00	2.9e+00	4.4e+00	PCI/L	02/22/2012 21:09 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01571J	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.000e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 21:09	100.0	GQ2B	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.27e+01	5.7e+00	3.1e+00	PCI/L	02/22/2012 21:09 CST
Beta	2.47e+00	3.2e+00	4.9e+00	PCI/L	02/22/2012 21:09 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01572K	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 21:09	100.0	GQ2C	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	8.27e-03	9.3e-01	8.6e-01	PCI/L	02/22/2012 21:09 CST
Beta	9.17e-01	1.1e+00	1.7e+00	PCI/L	02/22/2012 21:09 CST



**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01573L	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 21:09	100.0	GQ2D	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	-1.67e-01	8.7e-01	8.4e-01	PCI/L	02/22/2012 21:09 CST
Beta	3.21e-02	1.1e+00	1.7e+00	PCI/L	02/22/2012 21:09 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01574M	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 22:50	100.0	GQ2A	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.37e-02	1.4e+00	1.3e+00	PCI/L	02/22/2012 22:50 CST
Beta	1.91e+00	1.2e+00	1.8e+00	PCI/L	02/22/2012 22:50 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01575N	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 22:50	100.0	GQ2B	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	9.69e-01	1.6e+00	1.3e+00	PCI/L	02/22/2012 22:50 CST
Beta	4.74e-01	1.2e+00	1.9e+00	PCI/L	02/22/2012 22:50 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
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**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01623D	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 22:50	100.0	GQ2C	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	6.30e-01	1.5e+00	1.3e+00	PCI/L	02/22/2012 22:50 CST
Beta	1.86e+00	1.3e+00	1.9e+00	PCI/L	02/22/2012 22:50 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01624E	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 22:50	100.0	GQ2D	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.20e-01	1.5e+00	1.4e+00	PCI/L	02/22/2012 22:50 CST
Beta	2.67e+00	1.4e+00	2.0e+00	PCI/L	02/22/2012 22:50 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01625F	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 16:09	100.0	GQ2A	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.07e+00	1.7e+00	1.4e+00	PCI/L	02/22/2012 16:09 CST
Beta	2.62e+00	1.3e+00	1.9e+00	PCI/L	02/22/2012 16:09 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01626G	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.000e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 16:09	100.0	GQ2B	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.68e+00	3.6e+00	2.9e+00	PCI/L	02/22/2012 16:09 CST
Beta	4.64e+00	3.2e+00	4.7e+00	PCI/L	02/22/2012 16:09 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01728M	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	Aqueous		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 14:28	100.0	GQ2C	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.56e-01	9.7e-01	8.5e-01	PCI/L	02/22/2012 14:28 CST
Beta	6.14e-01	1.1e+00	1.7e+00	PCI/L	02/22/2012 14:28 CST



**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01728M	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	2.500e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	MS
Sample description:	N/A		
Comment:	Aqueous		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 14:28	100.0	GQ2B	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	7.48e+01	1.6e+01	8.5e-01	PCI/L	02/22/2012 14:28 CST
Beta	6.33e+01	8.2e+00	4.5e+00	PCI/L	02/22/2012 14:28 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01729N	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	1.000e-01 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 16:09	100.0	GQ2C	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	4.12e+00	4.3e+00	3.3e+00	PCI/L	02/22/2012 16:09 CST
Beta	3.11e+00	3.1e+00	4.7e+00	PCI/L	02/22/2012 16:09 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	B2.01730F	QC batch #:	0008475J
Matrix:	WATER-DRINKING	Assay batch #:	0015727M
Sample type:	SAM	Prep procedure:	N/A
Amount analyzed:	5.000e-02 L	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	ANA
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 16:09	100.0	GQ2D	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	3.30e+00	6.9e+00	5.9e+00	PCI/L	02/22/2012 16:09 CST
Beta	1.02e+01	6.5e+00	9.5e+00	PCI/L	02/22/2012 16:09 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	LCS-00631467U	QC batch #:	0008475J
Matrix:	N/A	Assay batch #:	0015727M
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	LCS
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 14:28	100.0	GQ2A	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	1.87e+01	4.0e+00	3.3e-01	PCI	02/22/2012 14:28 CST
Beta	1.55e+01	1.9e+00	1.1e+00	PCI	02/22/2012 14:28 CST

**U.S.ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG #1100246**

**SAMPLE ANALYSIS REPORT**

Sample #:	RBK-00631468V	QC batch #:	0008475J
Matrix:	N/A	Assay batch #:	0015727M
Sample type:	N/A	Prep procedure:	N/A
Amount analyzed:	1.000e+00 SAMP	Analysis procedure:	NAREL GR-01
Dry/wet weight:	N/A	Analyst:	CHD
Ash/dry weight:	N/A	QC type:	RBK
Sample description:	N/A		
Comment:	N/A		

**COUNTING INFORMATION**

Date and time	Duration (min)	Detector ID	Operator
02/22/2012 14:28	100.0	GQ2D	DJM

**ANALYTICAL RESULTS**

Analyte	Activity	$\pm 2 \sigma$ Uncertainty	MDC	Unit	Date
Alpha	2.89e-01	3.8e-01	3.1e-01	PCI	02/22/2012 14:28 CST
Beta	2.98e-01	3.1e-01	4.7e-01	PCI	02/22/2012 14:28 CST

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL AIR AND RADIATION ENVIRONMENTAL LABORATORY**

**SDG 1100246**

**QC BATCH SUMMARY**

QC batch #: 0008475J  
Preparation procedure: N/A  
Analysis procedure: NAREL GR-01

NAREL Sample #	QC Type	Yield (%)	$\pm 2 \sigma$ Uncertainty (%)	Analyst
B2.01498T	DUP	N/A		CHD
B2.01499U		N/A		CHD
B2.01510V		N/A		CHD
B2.01511W		N/A		CHD
B2.01513Y		N/A		CHD
B2.01514Z		N/A		CHD
B2.01515A		N/A		CHD
B2.01518D		N/A		CHD
B2.01518D		N/A		CHD
B2.01571J		N/A		CHD
B2.01572K		N/A		CHD
B2.01573L		N/A		CHD
B2.01574M		N/A		CHD
B2.01575N		N/A		CHD
B2.01623D		N/A		CHD
B2.01624E		N/A		CHD
B2.01625F		N/A		CHD
B2.01626G		N/A		CHD
B2.01728M		N/A		CHD
B2.01728M	MS	N/A		CHD
B2.01729N		N/A		CHD
B2.01730F	LCS	N/A		CHD
LCS-00631467U *		N/A		CHD
RBK-00631468V *	RBK	N/A		CHD

\* Samples marked with an asterisk are not in this sample delivery group but were analyzed with it for QC purposes.

National Air and Radiation Environmental Laboratory  
QC Batch Report

QC Batch #: 0008475J

Analytical Method: NAREL GR-01

METHOD BLANKS (PCI)

Sample ID	Nuclide	Activity $\pm 2\sigma$	Prep Date	Flags
00631468V	ALPHA	$2.89e-01 \pm 3.8e-01$	2012-02-16	OK
00631468V	BETA	$2.98e-01 \pm 3.1e-01$	2012-02-16	OK

LABORATORY DUPLICATES (PCI/L)

Sample ID	Nuclide	Original $\pm 2\sigma$	Duplicate $\pm 2\sigma$	RPD	Z
B2.01518D	ALPHA	$-6.35e-01 \pm 3.3e+00$	$4.35e+00 \pm 4.3e+00$	268.30	1.85 OK
B2.01518D	BETA	$3.99e+00 \pm 3.2e+00$	$2.36e+00 \pm 2.9e+00$	51.20	-0.75 OK

MATRIX SPIKES (PCI/L)

Sample ID	Nuclide	Amt Added $\pm 2\sigma$	Native $\pm 2\sigma$	Measured $\pm 2\sigma$	%R	Z
B2.01728M	ALPHA	$6.96e+01 \pm 2.2\%$	$2.56e-01 \pm 9.7e-01$	$7.48e+01 \pm 1.6e+01$	107.08	0.62 OK
B2.01728M	BETA	$6.20e+01 \pm 2.2\%$	$6.14e-01 \pm 1.1e+00$	$6.33e+01 \pm 8.2e+00$	101.09	0.16 OK

LAB CONTROL SAMPLES (PCI)

Sample ID	Nuclide	Amt Added $\pm 2\sigma$	Measured $\pm 2\sigma$	%R	Z
00631467U	ALPHA	$1.74e+01 \pm 2.2\%$	$1.87e+01 \pm 4.0e+00$	107.44	0.64 OK
00631467U	BETA	$1.55e+01 \pm 2.2\%$	$1.55e+01 \pm 1.9e+00$	99.78	-0.03 OK

Analyst:

*CH duBose*  
duBose, C H

*23 Feb 2012*

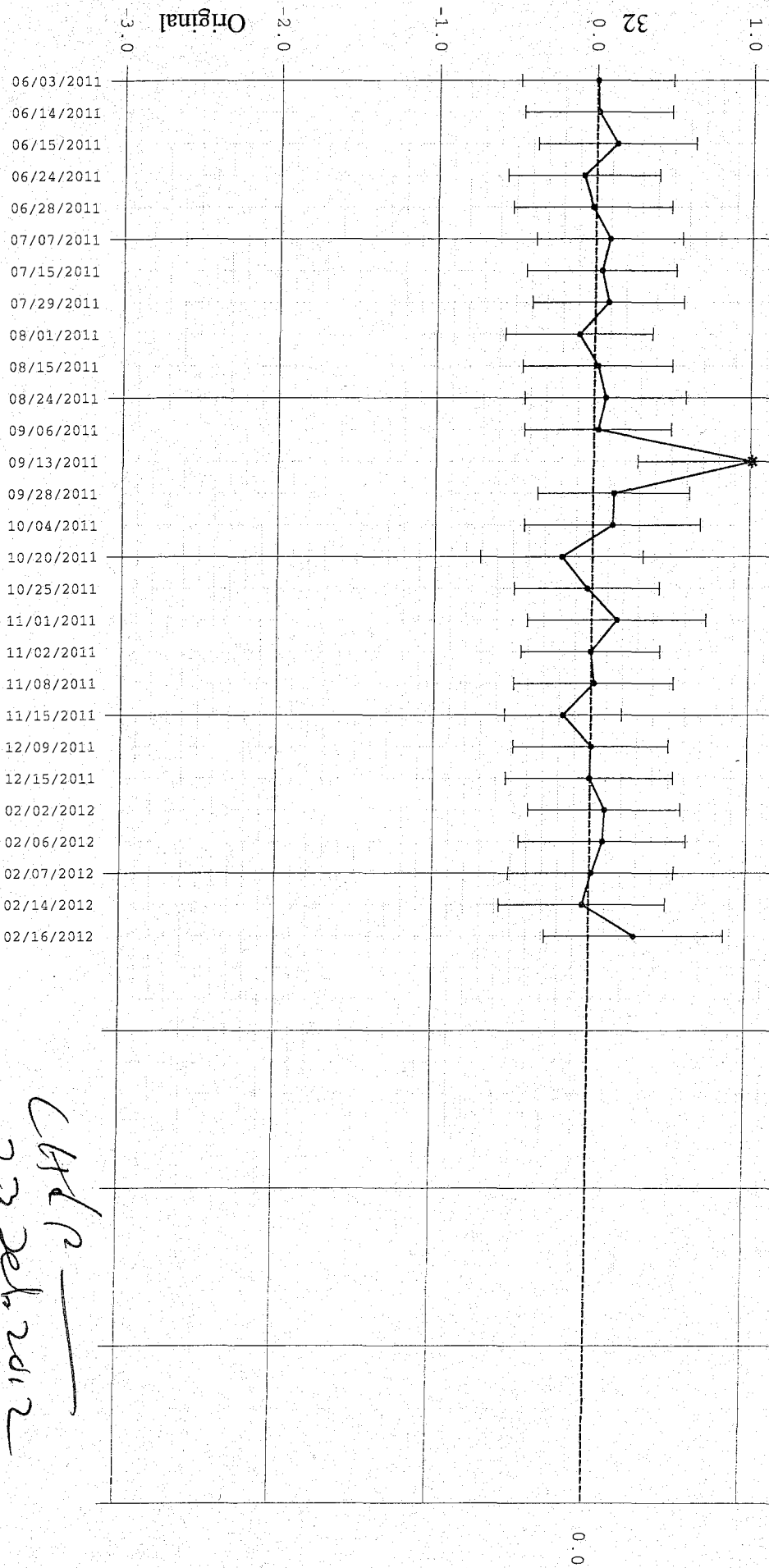
QA Officer:

*Kurt J McEwen*

*2/23/12*

Method Blanks  
Analyte: ALPHA  
Method: NAREL GR-01  
Analyst: duBose, C H

Report: 1100246-ALPBET

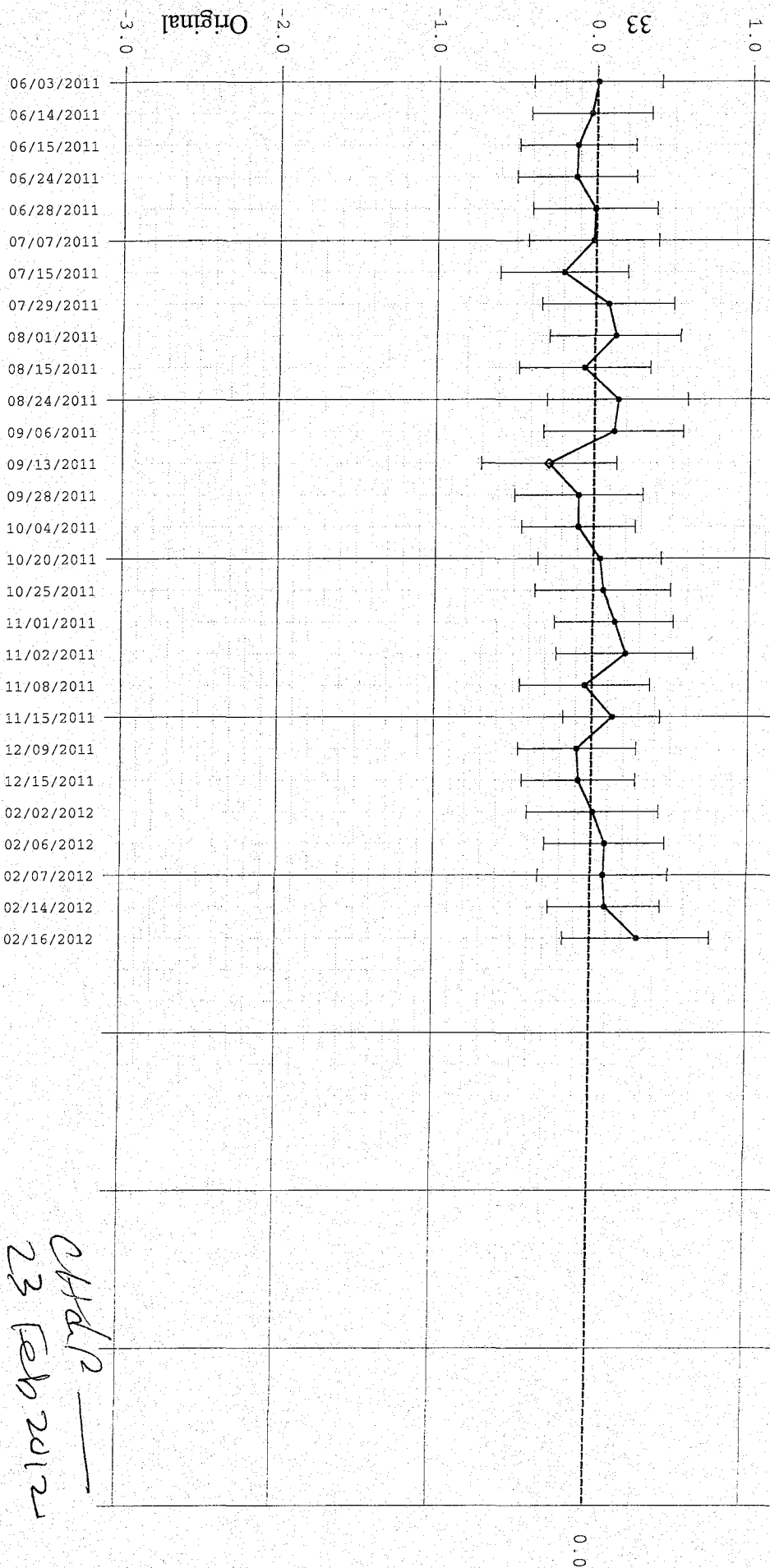


CHD/2  
23 Feb 2012



Method Blanks  
Analyte: BETA  
Method: NAREL GR-01  
Analyst: duBose, C H

Report: 1100246-ALPBET



CHd/P  
23 Feb 2012